

Automatic Delta Spray™ HVLP Spray Guns

309030D

100 psi (0.7 MPa, 7 bar) Maximum Working Fluid Pressure
100 psi (0.7 MPa, 7 bar) Maximum Working Air Pressure
43 psi (300 kPa, 3.0 bar) Maximum Compliant Inbound Air Pressure



Read warnings and instructions.

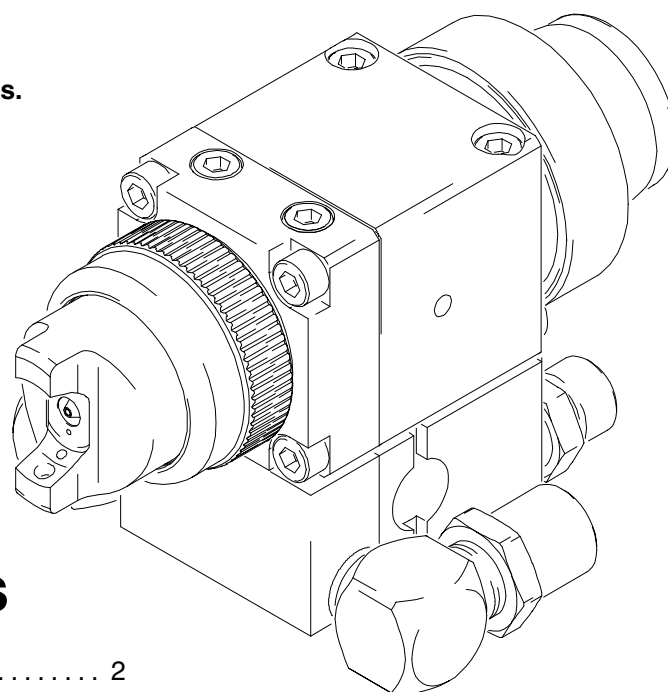


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Part No. 241745 HVLP Spray Gun shown mounted on Part No. 241697 Manifold.

Order the manifold separately from the gun. See page 26 for part numbers.

PROVEN QUALITY. LEADING TECHNOLOGY.

Symbols

Warning Symbol



This symbol alerts you to the possibility of serious injury or death if you do not follow the instructions.

Caution Symbol



This symbol alerts you to the possibility of damage to or destruction of equipment if you do not follow the instructions.

WARNING



INSTRUCTIONS

EQUIPMENT MISUSE HAZARD

Equipment misuse can cause the equipment to rupture, malfunction or start unexpectedly and result in serious injury.

- This equipment is for professional use only.
- Read all instruction manuals, tags, and labels before operating the equipment.
- Use the equipment only for its intended purpose. If you are uncertain about usage, call your Graco distributor.
- Do not alter or modify this equipment. Use only genuine Graco parts and accessories.
- Check equipment daily. Repair or replace worn or damaged parts immediately.
- Use this equipment only in low pressure, air spray systems.
- Do not exceed the maximum working pressure of the lowest rated system component. This equipment has a **100 psi (0.7 MPa, 7 bar) maximum working fluid and air pressure**.
- Route the hoses away from the traffic areas, sharp edges, moving parts, and hot surfaces. Do not expose Graco hoses to temperatures above 180°F (82°C) or below -40°F (-40°C).
- Wear hearing protection when operating this equipment.
- Use fluids or solvents that are compatible with equipment wetted parts. See the **Technical Data** section of all equipment manuals. Read the fluid and solvent manufacturer's warnings.
- Methylene Chloride with formic or propionic acid is not recommended as a flushing or cleaning solvent with this gun or any other device with nylon or aluminum components as it can damage these parts.
- Comply with all applicable local, state and national fire, electrical and other safety regulations.

WARNING



PRESSURIZED EQUIPMENT HAZARD



Spray from the gun, hose leaks or ruptured components can splash fluid in the eyes or on the skin and cause serious injury.

- Do not stop or deflect fluid leaks with your hand, body, glove or rag.
- Follow the **Pressure Relief Procedure** on page 13 when: you are instructed to relieve pressure; stop spraying; clean, check or service the equipment; and install or clean fluid nozzles.
- Do not point the spray gun at anyone or at any part of the body.
- Tighten all fluid connections before operating the equipment.
- Check the hoses, tubes and couplings daily. Replace worn, damaged or loose parts immediately. Permanently coupled hoses cannot be repaired; replace the entire hose.



FIRE AND EXPLOSION HAZARD

Poor air ventilation, open flames, or sparks can cause a hazardous condition and result in fire or explosion and serious injury.

- Provide fresh air ventilation to avoid the buildup of flammable fumes from solvent or the fluid being sprayed.
- Eliminate all ignition sources such as pilot lights, cigarettes and plastic drop cloths (static arc hazard). Do not plug or unplug power cords or turn lights on or off in the spray area.
- Electrically disconnect all equipment in the spray area.
- Keep the spray area free of debris, including solvent, rags and gasoline.
- Do not operate a gasoline engine in the spray area.



TOXIC FLUID HAZARD

Hazardous fluids or toxic fumes can cause serious injury or death if splashed in the eyes or on the skin, inhaled, or swallowed.

- Know the specific hazards of the fluid you are using. Read the fluid manufacturer's warnings.
- Store hazardous fluid in an approved container. Dispose of hazardous fluid according to all local, state and national guidelines.
- Dress appropriately for your application. Wear the appropriate protective clothing, gloves, eyewear, and respirator.

Selection Charts

TERMS:

Light Fluid:	Up to 18 seconds with No. 2 Zahn cup (20 centipoise)
Medium Fluid:	19 to 28 seconds with No. 2 Zahn cup (20–64 centipoise)
Heavy Fluid:	Greater than 28 seconds with No. 2 Zahn cup (greater than 64 centipoise) -- 2.8 Volatile Organic Compounds, High-solid Polyurethanes, Heavy Waterborne Enamels

HVLP Spray Gun Assemblies

Gun Assy. Part No.	Includes:		Orifice Size in. (mm)	Pattern Length† in. (mm)	Material Usage:	
	Needle/ Nozzle Kit Part No.	Air Cap Part No.			Viscosity	Flow oz./min. (l/min.)
241745	241769	195304	0.030 (0.762)	15 (381)	light	4–10 (0.12–0.30)
241746	241770	195304	0.042 (1.067)	16 (406)	light-medium	8–14 (0.24–0.42)
241747	241771	195304	0.055 (1.397)	16 (406)	medium	12–18 (0.36–0.54)
241748	241772	195305	0.070 (1.778)	17 (432)	medium-heavy	16–20 (0.48–0.60)
241751*	241775*	195304	0.042 (1.067)	16 (406)	light-medium	8–14 (0.24–0.42)
241752*	241776*	195304	0.055 (1.397)	16 (406)	medium	12–18 (0.36–0.54)

* Stainless steel needle/tip

† Measured with gun nozzle 10 in. (254 mm) from target surface

Selecting the Proper Needle/Nozzle Kit

The spray gun's needle/nozzle kits range in size to provide different fluid flow rates.

As a general guideline, use the fluid nozzle that will give the required flow with the needle fully triggered at the lowest fluid pressure.

For low flow rates or light viscosity fluid, select the smaller nozzle sizes.

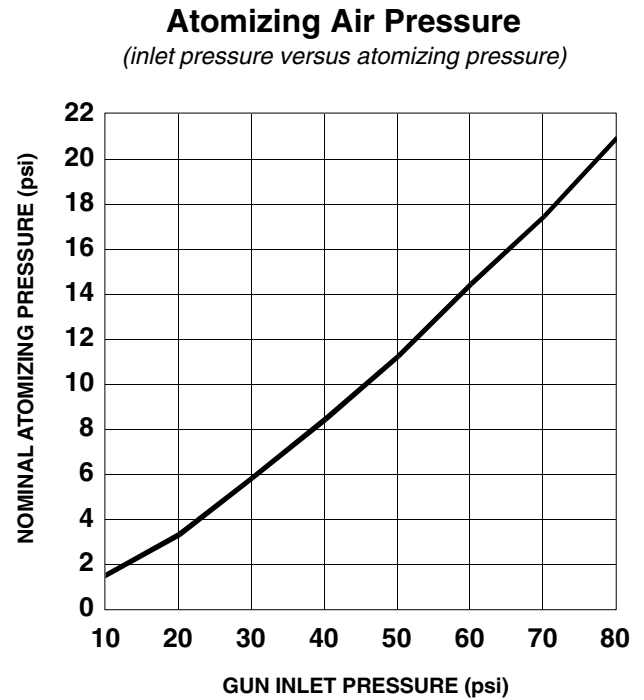
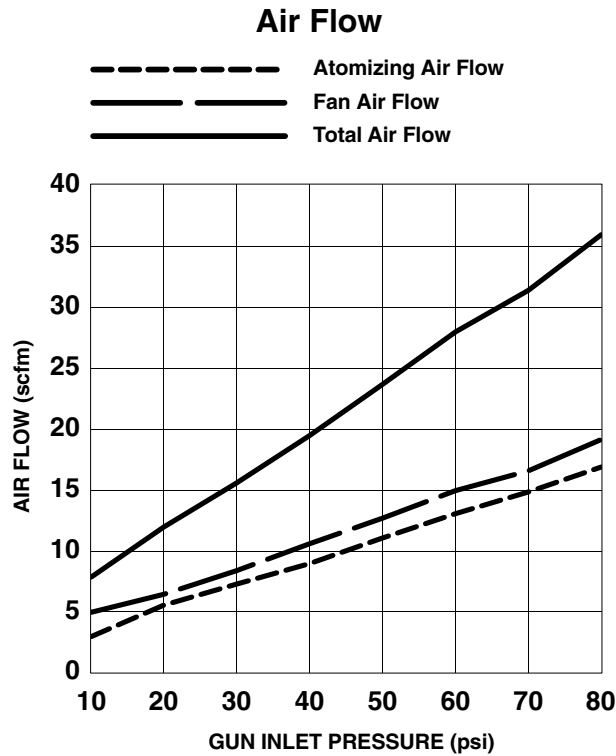
For high flow rates or high viscosity fluid, select the larger nozzle sizes.

NOTE:

- To help select the proper needle/nozzle size, a fluid pressure gauge may be connected temporarily to the gun fluid inlet to determine the fluid pressure. See **Accessories**, page 28.
- See page 19 for troubleshooting information.

Air Flow and Atomizing Pressure

NOTE: All tests were completed with the 0.055 in. (1.397 mm) nozzle and Part No. 195304 Air Cap, and equivalent gun inlet pressure applied to the atomization and fan ports (or fan adjustment valve fully open on manifold 243950).



Gun Inlet Pressure psi (kPa, bar)	Atomizing Air Flow scfm (m ³ /min)	Fan Air Flow scfm (m ³ /min)	Total Air Flow scfm (m ³ /min)
10 (70, 0.7)	2.9 (0.08)	4.9 (0.14)	7.8 (0.22)
20 (140, 1.4)	5.5 (0.15)	6.4 (0.18)	11.9 (0.33)
30 (210, 2.1)	7.2 (0.20)	8.3 (0.23)	15.5 (0.43)
40 (280, 2.8)	8.9 (0.25)	10.5 (0.29)	19.4 (0.54)
50 (345, 3.4)	11.0 (0.31)	12.6 (0.35)	23.6 (0.66)
60 (410, 4.1)	13.0 (0.36)	14.9 (0.42)	27.9 (0.78)
70 (480, 4.8)	14.8 (0.41)	16.5 (0.46)	31.3 (0.88)
80 (560, 5.6)	16.8 (0.47)	19.1 (0.53)	35.9 (1.00)

Gun Inlet Pressure psi (kPa, bar)	Nominal Atomizing Pressure psi (kPa, bar)
10 (70, 0.7)	1.6 (11, 0.11)
20 (140, 1.4)	3.4 (24, 0.24)
30 (210, 2.1)	5.9 (41, 0.41)
40 (280, 2.8)	8.5 (60, 0.6)
50 (345, 3.4)	11.3 (80, 0.8)
60 (410, 4.1)	14.5 (101, 1.01)
70 (480, 4.8)	17.5 (123, 1.23)
80 (560, 5.6)	21 (147, 1.47)

Installation


The Delta Spray HVLP spray gun was designed to produce the highest quality finish with today's fluids as well as the Low V.O.C. (volatile organic compound) fluids of tomorrow.


This spray gun can spray most coatings or finishes currently being used for automotive, industrial, aerospace, marine, wood, plastic and architectural applications, while easily operating from paint delivery systems such as pressure pots or remote pumps for production line operation.

NOTE: The HVLP spray gun typically uses 43 psi (300 kPa, 3.0 bar) inbound air pressure to produce high quality paint finishes at 10 psi (70 kPa, 0.7 bar) atomizing air pressure.


The air regulator must have a minimum air flow capacity of 30 scfm at 100 psi (0.7 MPa, 7 bar) air pressure.

Ventilate the Spray Booth

**WARNING**



To prevent hazardous concentrations of toxic and/or flammable vapors, spray only in a properly ventilated spray booth. Do not operate the spray gun unless ventilation fans are operating.



Check and follow all of the National, State and Local codes regarding air exhaust velocity requirements.

Check and follow all local safety and fire codes.



Configure the Gun and Manifold

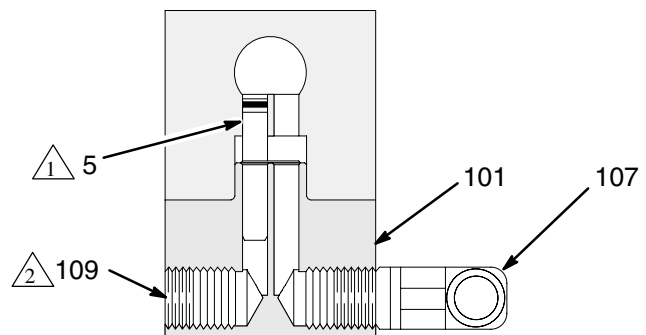
The gun is supplied with an internal fluid plug (5). See Fig. 1. To use the gun in a circulating system, remove the internal plug. In a non-circulating system, leave the plug in place to minimize flush time.

In a circulating system, apply anti-seize lubricant 222955 to the threads and mating faces of the manifold (101) and the elbows (107), supplied unassembled. Install the elbows (107) in both fluid ports of the manifold (101). Connect the fluid supply line to one elbow and the fluid return line to the other. The manifold fluid ports are reversible.

In a non-circulating system, apply anti-seize lubricant 222955 to the threads and mating faces of the manifold (101), a plug (109), and an elbow (107), supplied unassembled. Install an elbow (107) in one fluid port of the manifold (101), and a plug (109) in the other port. Install the internal plug (5) in the gun fluid port on the same side as the manifold plug. Connect the fluid supply line to the manifold elbow (107). See Fig. 1.

Non-Circulating Setup Shown (cutaway view)

-  Remove when used in circulating systems
-  Replace with an elbow (107) when used in circulating systems



8587A

Fig. 1

Install the gun on the manifold, using the four screws. Thread the screws by hand, then torque alternately and evenly to 65 in-lb (7.3 N•m).

Installation

Mount the Gun

To mount the gun on a reciprocating arm [0.5 in. (13 mm) diameter maximum], insert the bar (A) through the hole in the manifold as shown in Fig. 2. Secure the gun to the bar by tightening the mounting screw (B). The tip of the gun should be 6 to 8 inches (150 to 200 mm) from the surface of the object being sprayed.

KEY

- A Mounting Bar
- B Mounting Screw (on bottom of manifold)

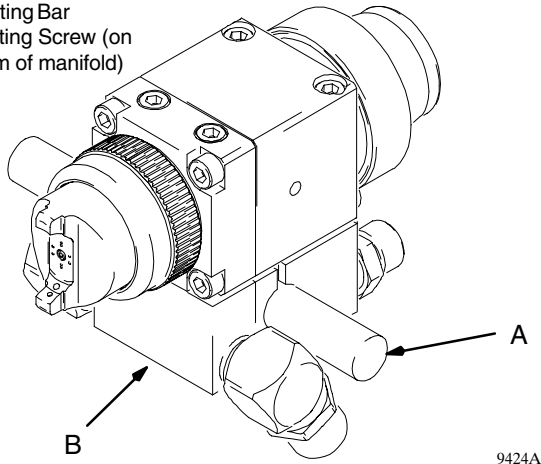


Fig. 2

To mount the gun on a stationary support, see Fig. 3. Also refer to the **Mounting Hole Layout** on page 29. Attach the gun to the support with two M5 x 0.8 capscrews (C). The screws must be long enough to engage the threaded holes in the gun manifold to a depth of 1/4 in. (6 mm). The tip of the gun should be 6 to 8 inches (150 to 200 mm) from the surface of the object being sprayed.

KEY

- C M5 x 0.8 Capscrews

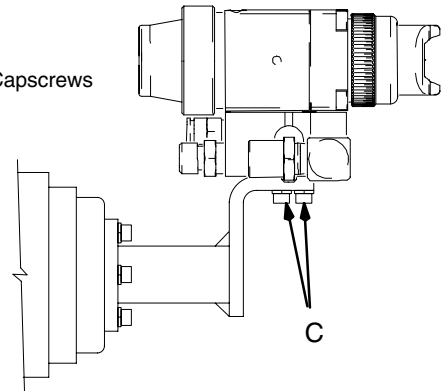


Fig. 3

Setup

1. Connect the Air Line

NOTE:

- You must install an air pressure regulator (F) on each gun air line to control air pressure to the gun. See Fig. 4.
 - If your regulated air source does not have a filter, install an air filter (G) on each air line to ensure a dry, clean air supply to the gun. Dirt and moisture can ruin the appearance of your finished workpiece. See Fig. 4.
 - Install an air shutoff valve (E) on each gun air supply line, downstream of the gun air regulator, to shut off air to the gun.
 - Use 5/16 inch (7.9 mm) I.D. air hoses to minimize excessive pressure drop in the hoses. See the **Pressure Drop Chart** on page 11 for the expected pressure drops through a 25 ft. (7.625 m) hose.
- A. For manifolds 241696 and 241697, the gun cylinder, fan, and atomization air must be supplied and regulated separately. Connect an air supply line to the fan air inlet (R) if desired. See Fig. 6. For manifold 243950, only one supply line is required for both atomization and fan air.

NOTE: The gun atomizing and fan air inlets are 1/4–18.6 npsm compound male thread that is compatible with 1/4–18 npsm and R1/4–19 bsp female swivel connectors. The cylinder air inlet accepts 1/4 in. (6.3 mm) O.D. tubing.

- B. Connect each air hose (D) to a regulated air supply line (H).

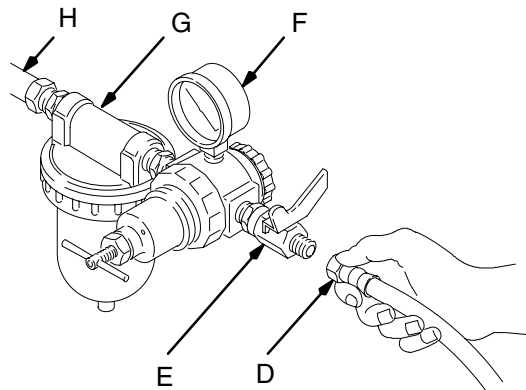


Fig. 4 _____ 01990

2. Connect the Fluid Hose

NOTE:

- Before connecting the fluid line, blow it out with air and flush it with solvent. Use solvent which is compatible with the fluid to be sprayed.
 - Install a fluid regulator (L) on the fluid line to control fluid pressure to the gun. See Fig. 5.
 - Install a fluid shutoff valve (M) to shut off the fluid supply to the gun.
 - Filter the fluid line of coarse particles and sediment to avoid clogging the fluid nozzle and causing finishing defects.
- A. Connect the fluid supply hose (J) to the gun fluid inlet (S) 3/8–18 npsm [R 3/8–19] compound thread. See Fig. 6.
- B. Connect the other end of the fluid hose (J) to a regulated fluid supply line (K).
- C. In a circulating system, connect a grounded fluid return hose to the gun fluid outlet (T).

In a non-circulating system, remove the gun fluid outlet fitting (T) and plug the outlet port with the pipe plug supplied.

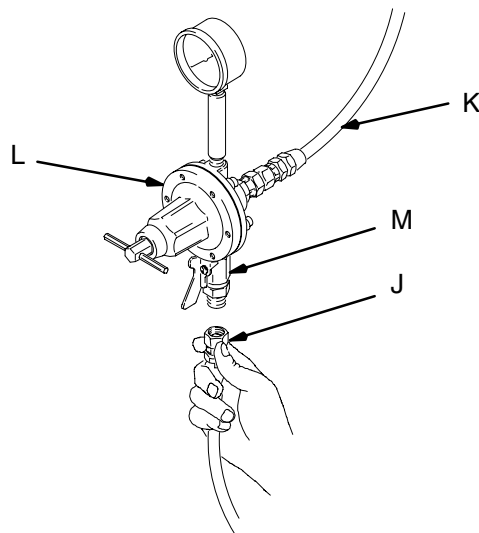


Fig. 5 _____ 7016A

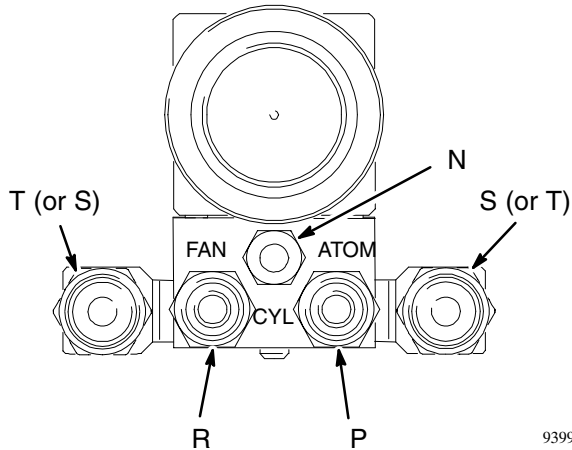
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Setup

KEY

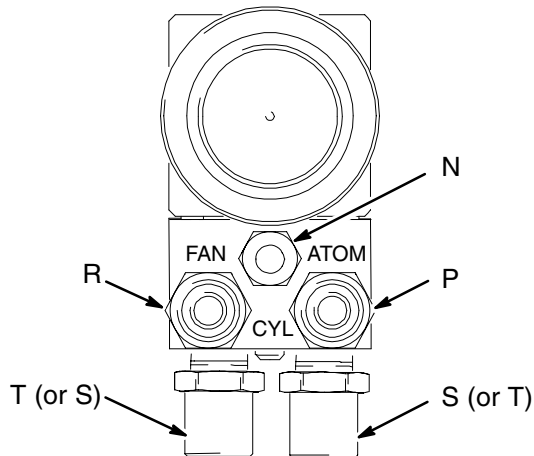
- N Cylinder Air Inlet: accepts 1/4 in. (6.3 mm) O.D. tubing
- P Atomization Air Inlet: 1/4–18.6 npsm
- R Fan Air Inlet: 1/4–18.6 npsm
- S Fluid Inlet: 3/8–18.6 npsm
- T Fluid Outlet (circulating gun only): 3/8–18.6 npsm

Side Mounted Manifold Ports



9399A

Bottom Mounted Manifold Ports



9400A

Fig. 6

3. Flush the Spray Gun.

Before putting any paint through the spray gun, flush the gun out with a solvent that is compatible with the fluid to be sprayed, using the lowest possible fluid pressure and a grounded metal container.

! WARNING

PRESSURIZED EQUIPMENT HAZARD

To reduce the risk of a serious injury whenever you are instructed to relieve pressure, follow the **Pressure Relief Procedure** on page 13.

4. Relieve the Pressure.

5. Position the Air Cap

Rotate the air cap as needed to achieve the desired spray pattern direction.

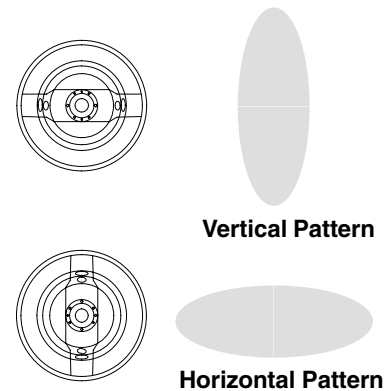


Fig. 7

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Setup

6. Adjust the Spray Pattern

WARNING

COMPONENT RUPTURE HAZARD



Do not exceed the **100 psi (0.7 MPa, 7 bar) maximum fluid and air pressure** of this gun. Higher pressures can cause parts to rupture and result in serious injury.

Follow these steps to establish the correct fluid flow and air flow:

- A.** Adjust the fluid flow using the fluid pressure regulator (L) installed in the gun fluid line. Typical industrial flow rates will vary with regulator pressures from 5 to 30 psi (34 to 210 kPa, 0.3 to 2.1 bar).

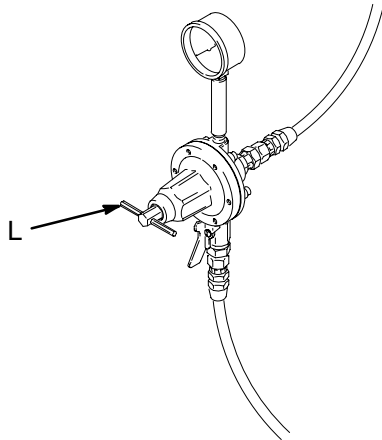


Fig. 8

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NOTE: A larger fluid nozzle at a reduced fluid pressure will maintain the same flow rate, but slow down the fluid stream (velocity). When air is applied, this allows the air to act on the fluid longer and improve the atomization.

- B.** Using the air pressure regulator (F), set the fan and atomizing air supply pressure at about 50 psi (345 kPa, 3.4 bar). *On manifolds 241696 and 241697*, the fan and atomization air must be supplied and regulated separately. *On manifold 243950*, one air line supplies both atomization and fan air. Adjust the pattern length and shape by altering fan air pressure (or adjusting the fan adjustment valve on manifold 243950). Refer to the **Pressure Drop Chart** on page 11 for the regulator setting vs gun inlet pressure.

If available, use the fluid manufacturer's recommendations to set the air line pressure for high volume, low pressure, spray gun application.

NOTE: Local laws may limit the maximum pressure to 10 psi (70 kPa, 0.7 bar) at the air cap for HVLP compliance. 43 psi (300 kPa, 3.0 bar) inlet air yields 10 psi (70 kPa, 0.7 bar) at the air cap.

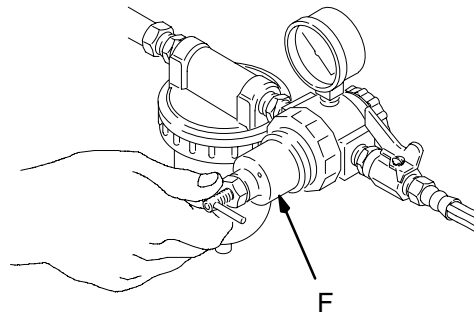


Fig. 9

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Continued on page 11.

Setup

- C. Test the spray pattern and atomization while keeping the gun a consistent distance, about 6 to 8 inches (150 to 200 mm), from the test piece.
- D. If the spray pattern is too wide, reduce the fan air pressure (or slightly close the fan adjustment valve on manifold 243950).

NOTE: Reducing the fan air pressure to 0 psi (or fully closing the fan adjustment valve) will produce a round pattern.
- E. Check the atomization quality again. Increase the gun air supply pressure with the air pressure regulator in 5 psi (34 kPa, 0.3 bar) increments until you obtain the desired atomization.
- F. If after increasing the gun air supply pressure the atomization is still unacceptable, try installing a larger fluid nozzle size to reduce the fluid velocity. Repeat steps 6-B to 6-E until you obtain the desired atomization.

Pressure Drop Chart (for separate fan and atomizing air supplies)

5/16 inch (7.9 mm) I.D. hose

Recommended hose size to minimize excessive pressure drop. Expected pressure drops measured using 25 ft. (7.625 m) long hose, with gun triggered.

Atomizing Air Regulator Pressure Setting psi (kPa, bar)	Atomizing Gun Inlet Pressure psi (kPa, bar)	Fan Air Regulator Pressure Setting psi (kPa, bar)	Fan Gun Inlet Pressure psi (kPa, bar)
13.0 (91, 0.9)	10 (70, 0.7)	11.5 (80, 0.8)	10 (70, 0.7)
24.0 (168, 1.7)	20 (140, 1.4)	23.0 (161, 1.6)	20 (140, 1.4)
34.8 (244, 2.4)	30 (210, 2.1)	34.5 (241, 2.4)	30 (210, 2.1)
46.0 (322, 3.2)	40 (280, 2.8)	46.9 (328, 3.3)	40 (280, 2.8)
57.0 (399, 4.0)	50 (345, 3.4)	56.8 (398, 4.0)	50 (345, 3.4)
68.0 (476, 4.8)	60 (410, 4.1)	68.0 (476, 4.8)	60 (410, 4.1)
79.5 (556, 5.6)	70 (490, 4.9)	79.4 (556, 5.6)	70 (490, 4.9)
90.0 (630, 6.3)	80 (560, 5.6)	90.3 (632, 6.3)	80 (560, 5.6)

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Operation

Pressure Relief Procedure

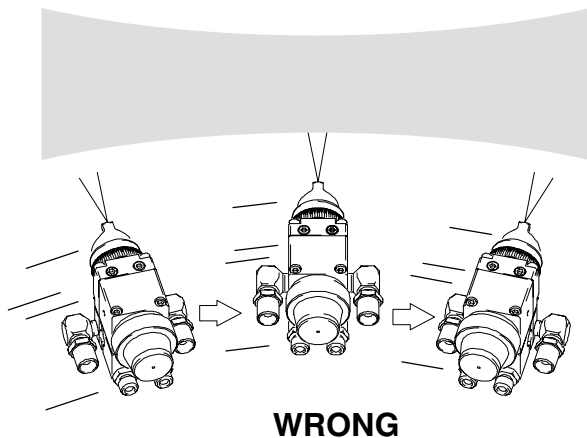
WARNING

PRESSURIZED EQUIPMENT HAZARD

The system pressure must be manually relieved to prevent the system from starting or spraying accidentally. To reduce the risk of an injury from accidental spray from the gun, splashing fluid, or moving parts, follow the **Pressure Relief Procedure** whenever you:

- are instructed to relieve the pressure,
- stop spraying,
- check or service any of the system equipment,
- or install or clean the spray nozzle.

1. Turn off the air and fluid supply to the gun.
2. Trigger the gun into a grounded metal waste container to relieve air and fluid pressure.



Applying the Fluid

When using the HVLP spray gun, instead of a conventional air spray gun, you may need to use slightly slower movement and make fewer passes with the gun to coat a part. This is due to the reduced spray velocity produced by lower HVLP air pressures, along with a larger fluid particle size because there is less air to blow off solvents than what is produced by conventional air spray. Take care to avoid runs or sags as you spray.

The spray gun has a built-in lead and lag operation. When triggered, the gun begins emitting air before the fluid is discharged. When the trigger actuation air is stopped, the fluid stops before the air flow stops. This helps assure the spray is atomized and prevents fluid buildup on the air cap and tip.

Adjust the system control device, if it is automatic, so the gun starts spraying just before meeting the workpiece and stops as soon as the workpiece has passed. Keep the gun a consistent distance, 6 to 8 inches (150 to 200 mm), from the surface of the object being sprayed.

To obtain an even finish, overlap the strokes 50%.

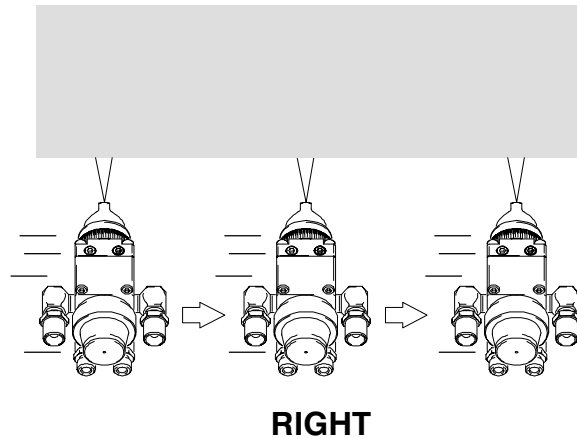


Fig. 10

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Daily Gun Care, Flushing, and Cleaning

⚠ WARNING

PRESSURIZED EQUIPMENT HAZARD

To reduce the risk of a serious injury whenever you are instructed to relieve pressure, follow the **Pressure Relief Procedure** on page 13.

⚠ CAUTION

Clean all parts with a non-conductive solvent, compatible with the fluid being sprayed. Conductive solvents can cause the gun to malfunction.

Methylene chloride with formic or propionic acid is not recommended as a flushing or cleaning solvent with this gun as it will damage aluminum and nylon components.

⚠ CAUTION

Solvent left in gun air passages could result in a poor quality paint finish. Do not use any cleaning method which may allow solvent into the gun air passages.

Do not point the gun up while cleaning it.



9391A

Do not wipe the gun with a cloth soaked in solvent; ring out the excess.



02027

Do not immerse the gun in solvent.



9392A

Do not use metal tools to clean the air cap holes as this may scratch them; scratches can distort the spray pattern.



02055

General System Maintenance

1. Relieve the pressure.
2. Clean the fluid and air line filters daily.
3. Check for any fluid leakage from the gun and fluid hoses. Tighten fittings or replace equipment as needed.
4. Flush the gun before changing colors and whenever you are done operating the gun.

Daily Gun Care, Flushing, and Cleaning

WARNING

PRESSURIZED EQUIPMENT HAZARD

To reduce the risk of a serious injury whenever you are instructed to relieve pressure, follow the **Pressure Relief Procedure** on page 13.

1. Relieve the pressure.
2. Shut off the gun fan and atomizing air.
3. Supply a compatible solvent to the gun fluid inlet.
4. Point the gun down into a grounded metal container, and flush the gun with solvent until all traces of paint are removed from the gun passages.
5. Relieve the pressure.
6. Disconnect the solvent supply.
7. Remove the air cap retaining ring and air cap.
8. Trigger the gun while you remove the fluid nozzle from the gun using a wrench, or remove the piston cap to relieve the pressure the springs put on the needle.

CAUTION

Trigger the gun or remove the piston cap whenever you tighten or remove the nozzle. This keeps the needle seat away from the nozzle seating surface and prevents the seat from being damaged.

9. Clean the air cap retaining ring, air cap, and fluid nozzle with solvent.
10. Dip the end of a soft-bristle brush into a compatible solvent. Do not continuously soak the brush's bristles with solvent and do not use a wire brush.

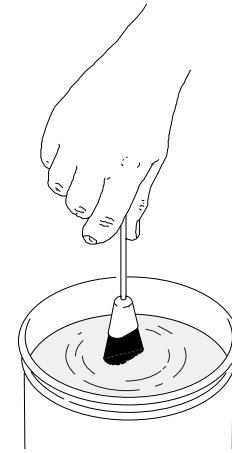


Fig. 11

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11. With the gun pointed down, clean the front of the gun, using the soft-bristle brush and solvent.
12. Scrub the air cap retaining ring, air cap, and fluid nozzle with the soft-bristle brush. To clean out air cap holes, use a soft implement, such as a toothpick, to avoid damaging critical surfaces. Clean the air cap and fluid nozzle daily, minimum. Some applications require more frequent cleaning.

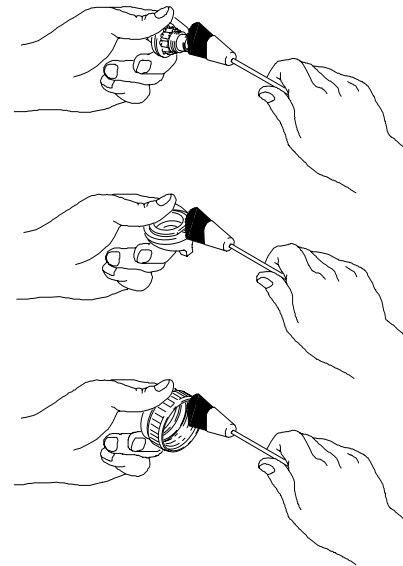


Fig. 12

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13. Trigger the gun or remove the piston cap while you install the fluid nozzle with the wrench. Tighten the nozzle securely to 145–155 in-lb (16.4–17.5 N•m) to obtain a good seal.
14. Install the air cap retaining ring and air cap.
15. Dampen a soft cloth with solvent and wring-out the excess. Point the gun down and wipe off the outside of the gun.

Troubleshooting



WARNING

PRESSURIZED EQUIPMENT HAZARD

To reduce the risk of a serious injury, follow the **Pressure Relief Procedure** on page 13 before checking or repairing any part of the gun or system.

NOTE:

- Check all possible remedies in the troubleshooting charts before disassembling the gun.
- Some improper patterns are caused by the improper balance between air and fluid. Refer to **Spray Pattern Troubleshooting**, on page 19.

General Troubleshooting

Problem	Cause	Solution
Fluid leakage through venting holes.	Worn packing (17) or needle (5).	Replace packing or needle.
Air leakage through venting hole.	Worn o-ring (9) or gasket (15).	Check and replace parts as needed.
Air leakage from back of gun.	Worn o-rings (8, 9).	Replace o-rings.
Air does not trigger.	Piston stem is disconnected from the main body of the piston assembly (3). Gasket (15) oriented incorrectly.	Replace piston assembly (3). Rotate gasket 90° so passages in gasket align with passages in gun.
Air does not shut off.	Piston assembly not seating properly. Swollen o-ring (8). Worn piston stem o-rings (10, 11). Bottom gasket (12) failed.	Clean/service piston assembly. Replace worn or swollen o-rings. Replace o-ring. Replace o-rings. Replace gasket.
Fluid leakage from front of gun.	Fluid needle tip (5a) is dirty, worn, or damaged. Dirty or worn nozzle (23).	Clean or replace fluid needle tip (5a) or entire needle (5). Clean or replace the nozzle.
Fluid is present at the air cap holes.	Nozzle (23) is insufficiently tightened or sealing surface is damaged.	Tighten or replace nozzle (23).

Troubleshooting

General Troubleshooting (continued)

Problem	Cause	Solution
Fluid needle will not trigger.	<p>Loose or missing fluid needle stop (29) or setscrew (30).</p> <p>Air leaking around piston (3).</p> <p>Swollen piston o-ring (8).</p> <p>Insufficient air pressure on the trigger.</p> <p>Plug (19) is in the incorrect fluid port.</p>	<p>Replace stop (29) or tighten setscrew (30).</p> <p>Replace o-ring (8) or piston (3).</p> <p>Replace o-ring (8). Do not immerse piston in solvent.</p> <p>Increase the air pressure or clean the air line.</p> <p>Move the plug to the fluid port consistent with the manifold plumbing, unless you are using the gun in a circulating system. If you are, all fluid ports in the gun and on the manifold should be open.</p>
Fluid does not shut off.	<p>Worn o-ring (11).</p> <p>Piston cap (4) not fully tightened.</p> <p>Spring (7) not in place.</p> <p>Swollen piston o-ring (8).</p>	<p>Replace o-ring.</p> <p>Tighten piston cap until it bottoms out.</p> <p>Check spring position.</p> <p>Replace o-ring (8). Do not immerse piston in solvent.</p>

This image shows a single sheet of white paper with horizontal ruling lines. The lines are evenly spaced and run across the width of the page. There are no margins, text, or other markings on the paper.

Troubleshooting

Spray Pattern Troubleshooting

WARNING

PRESSURIZED EQUIPMENT HAZARD

To reduce the risk of a serious injury, follow the **Pressure Relief Procedure** on page 13 before checking or repairing any part of the gun or system.

PROBLEM	CAUSE	SOLUTION
Fluid flow is fluttering while spraying	Fluid nozzle not tight enough	Tighten fluid nozzle to 125–135 in-lb (14–15 N•m).
	Fluid filter clogged	Check fluid filter.
Fluid flow fades while spraying high viscosity fluids	Air hose size is too restricted for higher air flow being used	Use 5/16 in. (7.9 mm) I.D. air hose if the hose is 25 ft. (7.625 m) long. If longer hose is needed, use a 3/8 in. (9.5 mm) I.D. hose.
	Fluid pressure too low, causing fluid flow to reduce when gun is elevated	Raise fluid pressure at source or use a smaller fluid nozzle.
Pattern becomes off-set or heavy on ends	Air cap horn holes plugged or damaged	Clean air cap horn holes with non-metallic item such as a toothpick, or replace air cap.
Gun fluid <u>pressure</u> is too high with gun triggered	Using needle/nozzle kit with too small orifice	Use needle/nozzle kit with larger orifice
Using a low fluid pressure setting, the fluid <u>flow</u> is too high, making it necessary to restrict needle travel to reduce fluid flow	Using needle/nozzle kit with too large orifice	Use needle/nozzle kit with smaller orifice
Fluid system will not operate at low enough fluid pressure [below 10 psi (70 kPa, 0.7 bar)]	There is no fluid regulator, or air regulator on pressure pot is not sensitive enough at low pressures	Add low pressure fluid regulator, or add more sensitive low pressure air regulator on pressure pot.

Service

Items Needed for Service

- 1/16 in. Hex Wrench – provided
- Adjustable Wrench
- Pliers
- Lubricant part no. 111265; see **Accessories**, page 28, to order
- Compatible Solvent

Fluid Packings Replacement

WARNING

PRESSURIZED EQUIPMENT HAZARD

To reduce the risk of a serious injury, follow the **Pressure Relief Procedure** on page 13 before checking or repairing any part of the gun or system.

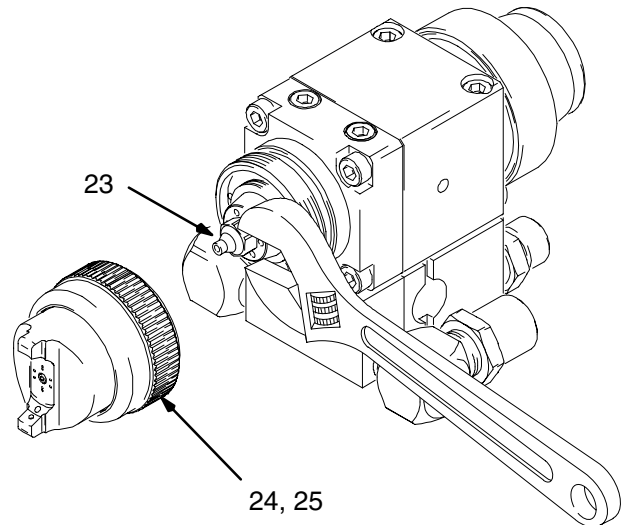
NOTE:

- Air Section Repair Kit 241698 and Fluid Section Repair Kit 241699 are available. Purchase the kits separately.

1. Relieve the pressure.
2. Unscrew the four screws (13) and remove the gun from the manifold.
3. Remove the air cap retainer (25) and air cap (24). See Fig. 13.
4. Trigger the gun while you remove the fluid nozzle (23) with the wrench.

CAUTION

Trigger the gun whenever you tighten or remove the nozzle. This keeps the needle seat away from the nozzle seating surface and prevents the seat from being scratched.

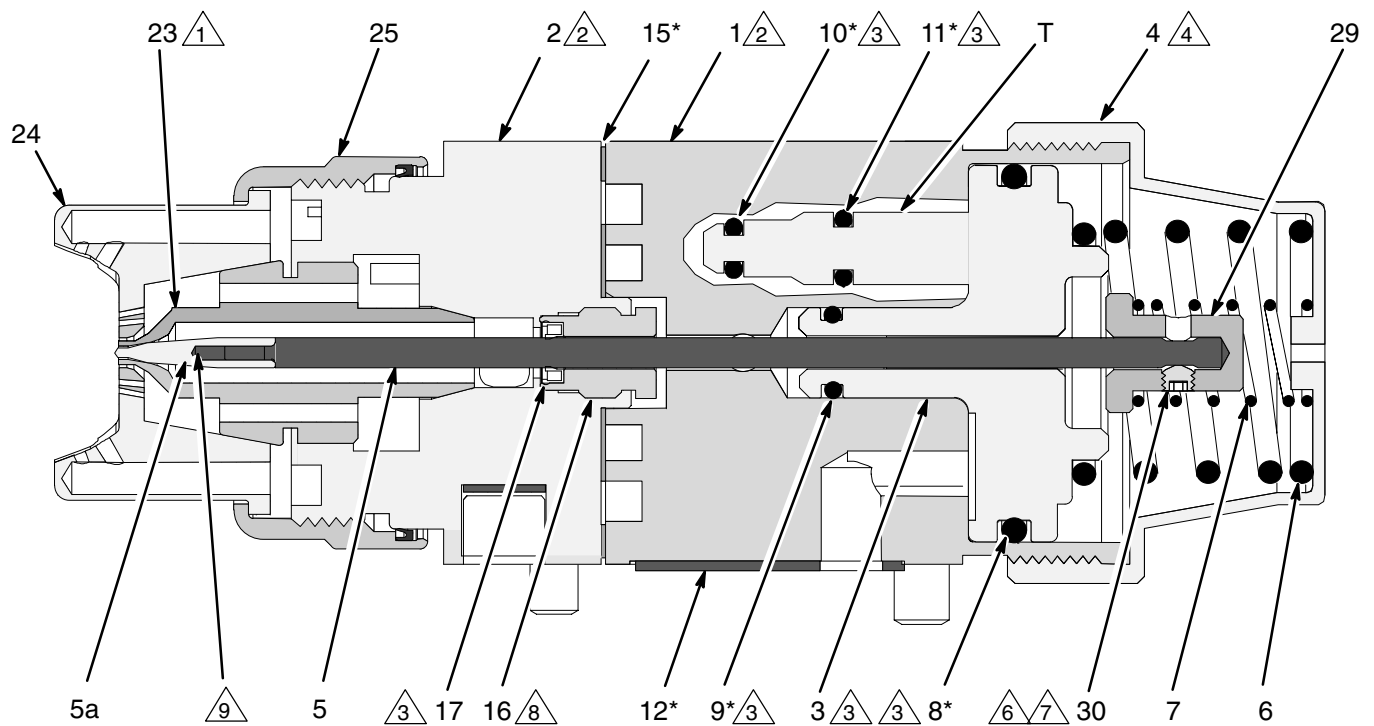


9397A

Fig. 13

5. Remove the piston cap (4) from the piston housing (1). Remove the springs (6, 7).
6. Using a 1/16 in. hex wrench loosen the fluid needle set screw (30). Remove the needle stop (29).
7. Pull the fluid needle (5) out the back of the gun.
8. Check the fluid needle (5) for damage or excessive wear. Replace the needle tip (5a) or the entire needle if necessary.
9. Unscrew the four screws (14) and separate the fluid housing (2) and the piston housing (1). Remove both the gaskets (12, 15).
10. Remove the packing nut (16) with a wrench.
11. Remove the fluid packing (17) from the nut (16). Discard the old fluid packing.
12. Using a pliers, pull the piston (3) out of the piston housing (1).
13. Remove all o-rings from the piston (3) and stems (T). Check that the stems are solidly in place. If they are loose, replace the entire piston assembly (3).
14. Perform the following applicable step:
 - a. *Non-circulating guns:* Remove the fluid outlet port plug (19), and gasket (22) from the fluid housing (2). Remove the o-ring (21) and backup (20) from the plug.
 - b. *Circulating guns:* Remove the gasket (22) from the fluid housing (2).
15. Clean all parts and replace any worn parts. When assembling, lubricate the threads with anti-seize lubricant.

Service



9390A

**Cutaway View;
Part No. 241745 Gun Shown**

SERVICE NOTES:










-  Torque to 145–155 in-lb (16.4–17.5 N•m)
-  Lubricate threads with anti-seize lubricant
-  Lubricate with light-weight oil
-  Tighten cap (4) until it bottoms out
-  Torque to 65 in-lb (7.3 N•m)
-  Apply semi-permanent anaerobic sealant.
-  Torque to 4–5 in-lb (0.45–0.56 N•m)
-  Torque to 95–105 in-lb (10.7–11.8 N•m)
-  Apply semi-permanent anaerobic sealant to two threads at the end of the needle shaft.

Fig. 14

Service

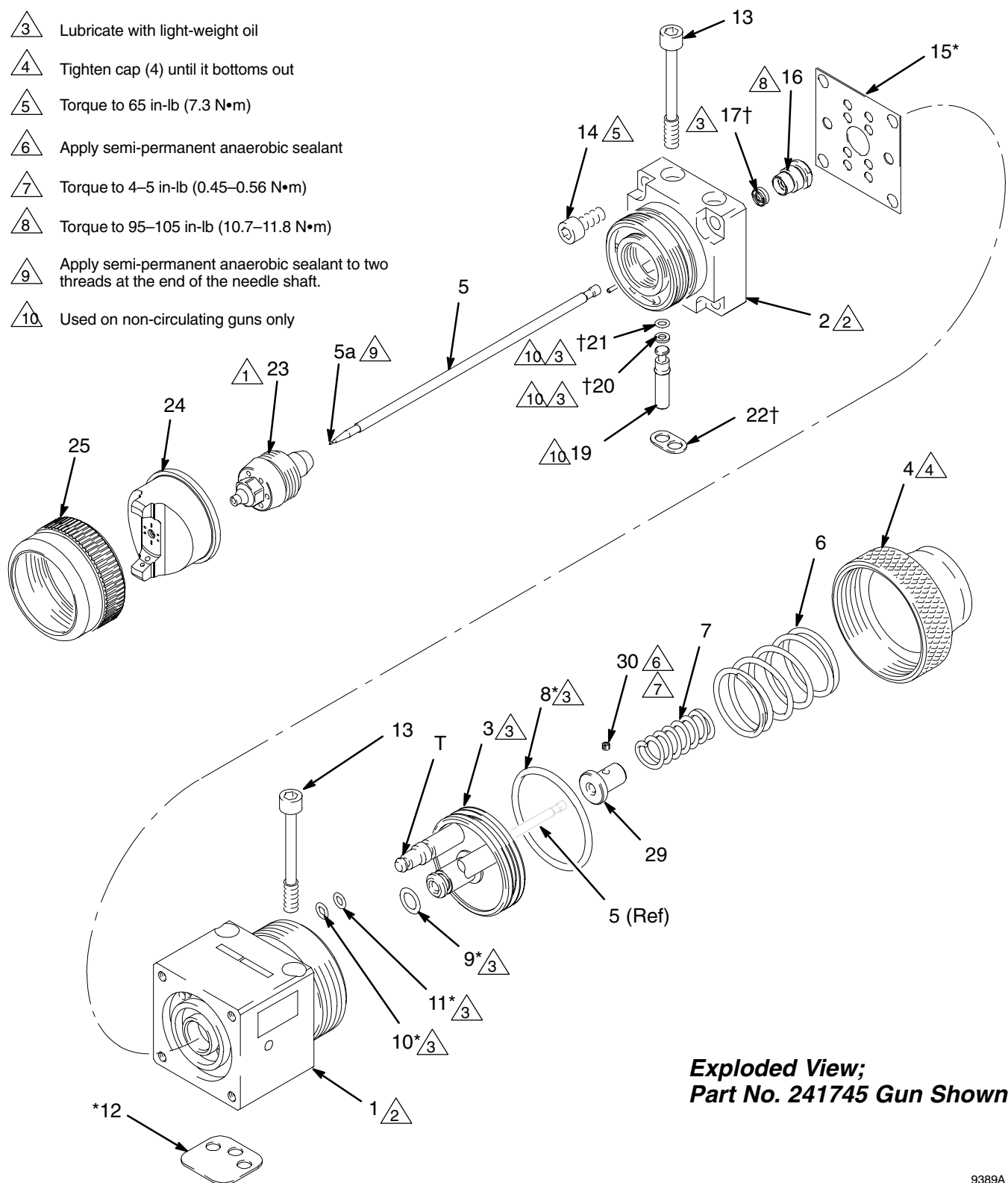
Reassembly

1. *Non-circulating guns only:* Lubricate the backup (20†) and o-ring (21†) and install them on the fluid outlet port plug (19). Install the plug in the fluid outlet port of the fluid housing (2). See Fig. 15.
 2. *All guns:* Reinstall the gasket (22) in the fluid housing (2).
 3. Install the o-rings (8*, 9*) on the piston (3). Install two o-rings (10*, 11*) on each of the piston stems (T). Lubricate all the o-rings, the piston, and the piston stems.
 4. Insert the piston (3) into the piston housing (1).
 5. Remove the protective paper from the sticky side of the gasket (12*) and adhere the gasket to the bottom of the piston housing (1), making sure the three holes in the gasket are properly aligned with the matching holes in the housing.
 6. Lubricate the new fluid packing (17†) and insert it into the packing nut (16). Insert the packing nut into the fluid housing (2) and torque to 95–105 in-lb (10.7–11.8 N•m).
 7. Align the gasket (15*) as shown in the exploded view in Fig. 15. Place the gasket on the piston housing (1), then install the fluid housing (2) onto the piston housing. Torque the four screws (14) to 65 in-lb (7.3 N•m).
 8. To avoid galling of the fluid nozzle seat in the fluid housing, apply a thin film of lubricant to the seat. Install the nozzle into the fluid housing. Torque the nozzle securely to 145–155 in-lb (16.4–17.5 N•m).
- NOTE:** If you are replacing the needle tip (5a), apply semi-permanent anaerobic sealant to two threads at the end of the needle shaft. Assemble the needle tip to the shaft and hand tighten. Allow adequate time for the sealant to cure before installing the needle assembly into the gun.
9. Lubricate and install the needle (5) into the back of the gun assembly. Push it straight in through the piston.
 10. Install the needle stop (29) on the needle. Coat the setscrew (30) with semi-permanent anaerobic sealant and install the screw into the needle stop. Torque to 4–5 in-lb (0.45–0.56 N•m). Pull on the needle to make sure it seats fully.
 11. Install the springs (6, 7).
 12. Lubricate the threads of the piston housing (1). Screw the cap (4) onto the housing until it bottoms out.
 13. Install the air cap (24) and air cap retainer (25).
 14. Reinstall the gun on the manifold with the four screws (13). Torque to 65 in-lb (7.3 N•m).

Service

SERVICE NOTES:

- △1 Torque to 145–155 in-lb (16.4–17.5 N•m)
- △2 Lubricate threads with anti-seize lubricant
- △3 Lubricate with light-weight oil
- △4 Tighten cap (4) until it bottoms out
- △5 Torque to 65 in-lb (7.3 N•m)
- △6 Apply semi-permanent anaerobic sealant
- △7 Torque to 4–5 in-lb (0.45–0.56 N•m)
- △8 Torque to 95–105 in-lb (10.7–11.8 N•m)
- △9 Apply semi-permanent anaerobic sealant to two threads at the end of the needle shaft.
- △10 Used on non-circulating guns only



9389A

Fig. 15

Parts

Part No. 241745 to 241752, Series A

Automatic HVLP Spray Gun

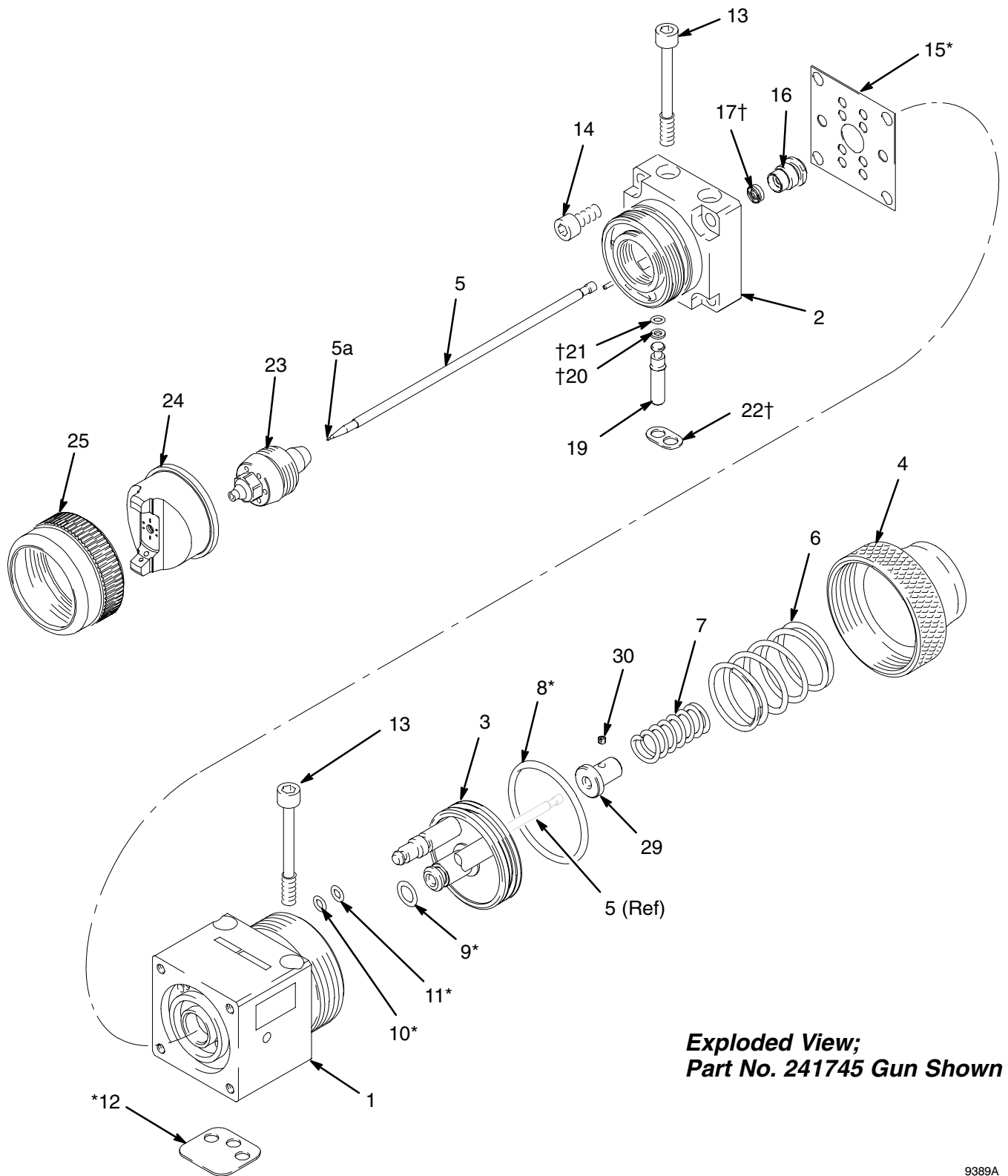
Includes items 1–30

Ref. No.	Part No.	Description	Qty.	Ref. No.	Part No.	Description	Qty.
1	195317	HOUSING, piston	1	17†	115347	PACKING, fluid	1
2	195221	HOUSING, fluid; stainless steel	1	19	192687	PLUG, fluid, internal; stainless steel	1
3	240895	PISTON	1	20†	114340	RING, backup; PTFE	1
4	192453	CAP, piston	1	21†	114244	O-RING; 0.210 in. (5.3 mm) OD; fluoroelastomer	1
5✓	See Table	NEEDLE ASSEMBLY; includes item 5a	1	22†☆	192443	GASKET, fluid; acetal homopolymer	2
5a✓	See Table	. NEEDLE TIP	1	23✓	See Table	NOZZLE	1
6✓	114139	SPRING, compression	1	24✓	See Table	AIR CAP	1
7✓	114138	SPRING, compression	1	25	239953	RETAINER, air cap	1
8*	115066	O-RING; 1.568 in. (40 mm) OD; fluoroelastomer	1	29	192452	STOP, needle; stainless steel	1
9*	111450	O-RING; 0.373 in. (9.5 mm) OD; fluoroelastomer	1	30	114137	SCREW, set; 6–32; 1/8 in. long	1
10*	111504	O-RING; 0.254 in. (6.5 mm) OD; fluoroelastomer	2	34	114141	WRENCH, hex; not shown	1
11*	112319	O-RING; 0.316 in. (8 mm) OD; fluoroelastomer	2	☆ An extra gasket (22) is included as a spare.			
12*	114134	GASKET; polyethylene	1	* These parts are included in Air Seal Repair Kit 241698, which may be purchased separately.			
13	114135	SCREW, cap, socket head; M5 x 0.8; 45 mm long	4	† These parts are included in Fluid Repair Kit 241699, which may be purchased separately.			
14	114136	SCREW, cap, socket head; M5 x 0.8; 20 mm long	4	✓ Keep these spare parts on hand to reduce down time.			
15*	115334	GASKET; polyethylene	1				
16	195222	PACKING NUT	1				

Gun Part No.	Needle/ Nozzle Kit <i>Includes items 5 & 23</i>	Item 5 Needle Assy. <i>Includes item 5a</i>	Item 5a Needle Tip	Item 23 Nozzle	Item 24 Air Cap	Orifice Size in. (mm)
241745	241769	241761	192304	192295	195304	.030 (.762)
241746	241770	241762	192305	192296	195304	.042 (1.067)
241747	241771	241763	192306	192297	195304	.055 (1.397)
241748	241772	241764	192307	192298	195305	.070 (1.778)
not available as gun assembly	241773	241765	192308	192299	195305	.086 (2.184)
not available as gun assembly	241774	241766	192309	192300	195306	.110 (2.794)
241751**	241775	241767	192310	192301	195304	.042 (1.067)
241752**	241776	241768	192311	192302	195304	.055 (1.397)

** These guns have a stainless steel needle tip, which is not recommended except for applications where it is necessary.

Parts



***Exploded View;
Part No. 241745 Gun Shown***

9389A

Parts

Use Only Genuine Graco Parts and Accessories

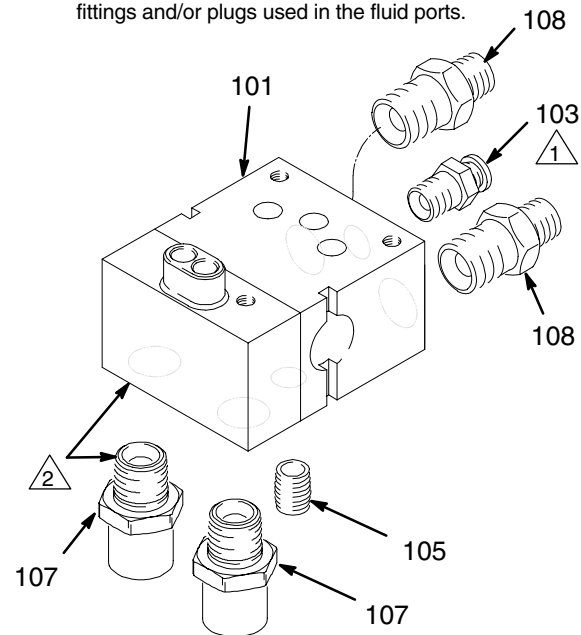
Part No. 241696, Series A

Manifold with bottom fluid ports

Ref. No.	Part No.	Description	Qty.
101	241695	MANIFOLD, bottom fluid ports	1
103	113208	FITTING, tube, air inlet; 1/4 in. (6.3 mm) OD tube x 1/8 npt(m)	1
105	114246	SCREW, set; 5/16; 0.437 in. long	1
107	195224	NIPPLE, reducing; stainless steel; 3/8–18.6 straight pipe thread x 1/4 npt	2
108	180191	NIPPLE, air line; 1/4"–18.6 npsm x 1/4 npt	2
109	101970	PLUG, pipe; 1/4–18 ptf; stainless steel; not shown; supplied to plug fluid outlet port in non-circulating applications	1

△1 Flats must be parallel to the surface of the manifold (101) to prevent interference with the gun.

△2 Apply anti-seize lubricant 222955 to threads and mating faces of manifold (101) and any fittings and/or plugs used in the fluid ports.



Part No. 241696

9398A

Parts

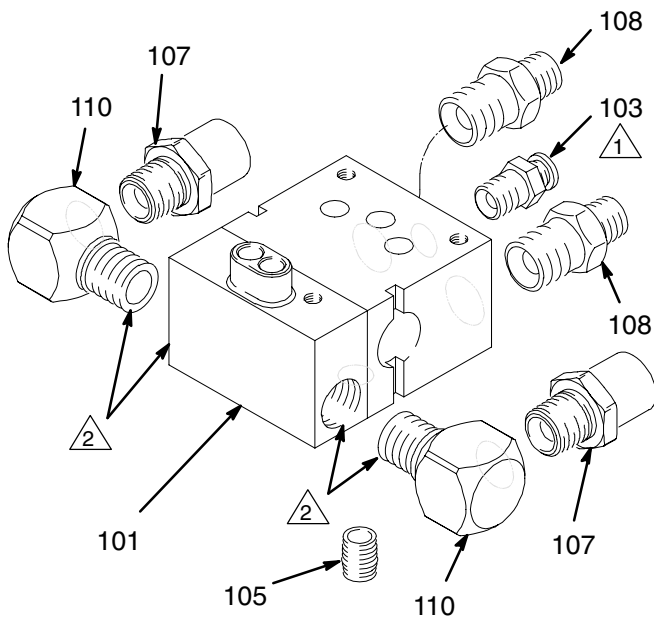
Use Only Genuine Graco Parts and Accessories

Part No. 241697, Series A

Manifold with side fluid ports

Ref. No.	Part No.	Description	Qty.
101	239892	MANIFOLD, side fluid ports	1
103	113208	FITTING, tube, air inlet; 1/4 in. (6.3 mm) OD tube x 1/8 npt(m)	1
105	114246	SCREW, set; 5/16; 0.437 in. long	1
107	195224	NIPPLE, reducing; stainless steel; 3/8–18.6 straight pipe thread x 1/4 npt	2
108	180191	NIPPLE, air line; 1/4"–18.6 npsm x 1/4 npt	2
109	101970	PLUG, pipe; 1/4–18 ptf; stainless steel; not shown; supplied to plug fluid outlet port in non-circulating applications	1
110	115335	ELBOW, street; 1/4 npt (m x f); stainless steel	2

- 1 Flats must be parallel to the surface of the manifold (101) to prevent interference with the gun.
- 2 Apply anti-seize lubricant 222955 to threads and mating faces of manifold (101) and any fittings and/or plugs used in the fluid ports.



Part No. 241697

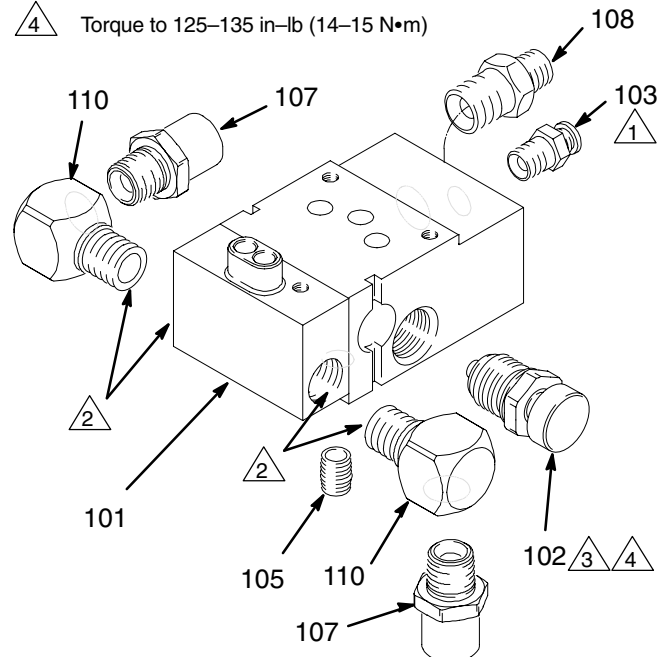
9396A

Part No. 243950, Series A

Manifold with side fluid ports and fan adjustment valve

Ref. No.	Part No.	Description	Qty.
101		MANIFOLD, side fluid ports; not available separately	1
102	243949	FAN ADJUSTMENT VALVE	1
103	113208	FITTING, tube, air inlet; 1/4 in. (6.3 mm) OD tube x 1/8 npt(m)	1
105	114246	SCREW, set; 5/16; 0.437 in. long	1
107	195224	NIPPLE, reducing; stainless steel; 3/8–18.6 straight pipe thread x 1/4 npt	2
108	180191	NIPPLE, air line; 1/4"–18.6 npsm x 1/4 npt	1
109	101970	PLUG, pipe; 1/4–18 ptf; stainless steel; not shown; supplied to plug fluid outlet port in non-circulating applications	1
110	115335	ELBOW, street; 1/4 npt (m x f); stainless steel	2

- 1 Flats must be parallel to the surface of the manifold (101) to prevent interference with the gun.
- 2 Apply anti-seize lubricant 222955 to threads and mating faces of manifold (101) and any fittings and/or plugs used in the fluid ports.
- 3 Install with valve turned fully counterclockwise to the outermost position.
- 4 Torque to 125–135 in-lb (14–15 N•m)



Part No. 243950

TI0555A

309030

27

Accessories

Cleaning Brush 105749

For use in cleaning gun

Lubricant 111265

One 4 oz. (113 gram) tube sanitary (non-silicone) lubricant for fluid seals and wear areas.

Fluid Whip Hose Assembly 239622

100 psi (0.7 MPa, 7 bar) Maximum Working Pressure
Eases gun movement with increased hose flexibility.
4 ft. (1.22 m) long, 3/16 in. (4.76 mm) I.D.,
3/8 npsm(fbe), nylon with polyurethane cover

Whip Hose Parts Breakdown

Part No.	Description
239630	FITTING ASSY, male
239629	FITTING ASSY, swivel
061345	TUBING; 1000 ft. (305 m) roll

Fluid Hose Assembly

100 psi (0.7 MPa, 7 bar) Maximum Working Pressure
3/16 in. (4.76 mm) I.D., 3/8 npsm(fbe), nylon with
polyurethane cover

Part No.	Length
239633	15 ft. (4.58 m)
239634	25 ft. (7.63 m)

Fluid Hose Parts Breakdown

Part No.	Description
239629	FITTING ASSY, swivel
061345	TUBING; 1000 ft. (305 m) roll

Air Hose Assembly

100 psi (0.7 MPa, 7 bar) Maximum Working Pressure
5/16 in. (7.94 mm) I.D., 1/4 npsm(f) swivel, nitrile

Part No.	Length
239636	15 ft. (4.58 m)
239637	25 ft. (7.63 m)

Air Whip Hose Assembly 239631

100 psi (0.7 MPa, 7 bar) Maximum Working Pressure
Eases gun movement with increased hose flexibility.
4 ft. (1.22 m) long, 5/16 in. (7.94 mm) I.D., 1/4 npsm(f)
swivel, nitrile

Air Hose Assembly 185353

100 psi (0.7 MPa, 7 bar) Maximum Working Pressure
Optional air hose for use when higher air flow is
required. 25 ft. (7.625 m) long, 3/8 in. (9.53 mm) I.D.,
1/4 npsm(f) swivel, buna-n

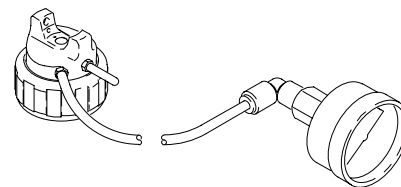
Air Pressure Verification Kit

For use in checking air cap atomizing or pattern air
pressure at various supply air pressures. **Not to be
used for actual spraying.**

Install the kit air cap on the gun. Turn on the air to the
gun, then trigger the gun and read the air pressure on
the gauge.

NOTE: To be "HVLV compliant", the atomizing air
pressure must not exceed 10 psi (70 kPa, 0.7 bar).

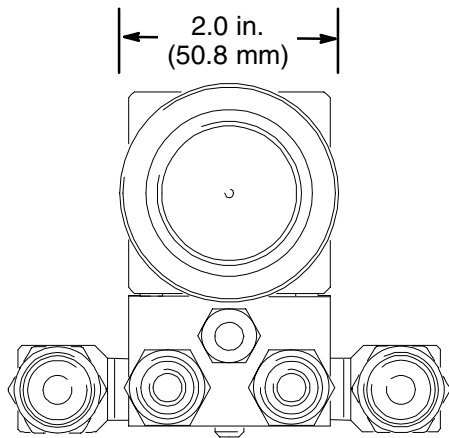
Part No.	Orifice in. (mm)
239609	0.030, 0.042, 0.055 (0.762, 1.067, 1.397)
239610	0.070, 0.086 (1.778, 2.184)
239611	0.110 (2.790)



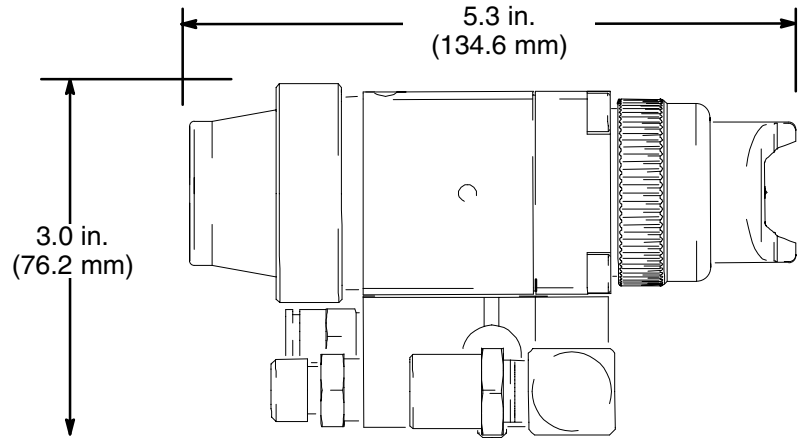
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Dimensions

Part No. 241697 Manifold Shown

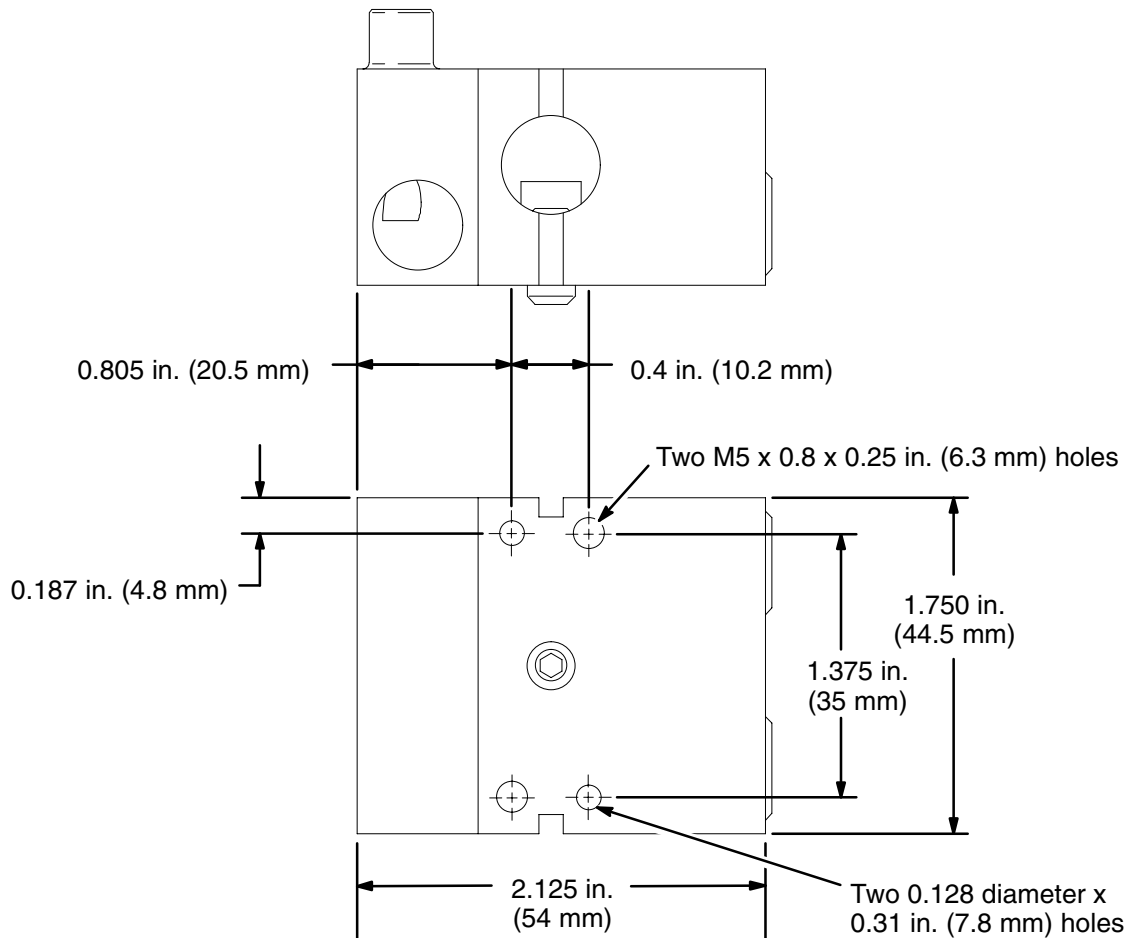


9399A



9401A

Mounting Hole Layout



9422A

Technical Data

Maximum working fluid pressure	100 psi (0.7 MPa, 7 bar)
Maximum working air pressure	100 psi (0.7 MPa, 7 bar)
Maximum compliant inbound air pressure (HVLP)	43 psi (300 kPa, 3 bar)
Maximum working fluid temperature	120° F (49° C)
Minimum air cylinder actuation pressure	50 psi (0.34 MPa, 3.4 bar)
Weight	2.2 lb (992 g)
Wetted Parts	Stainless Steel, Ultra High Molecular Weight Polyethylene, Chemically Resistant Fluoroelastomer, Delrin®, PTFE, PEEK

Delrin® is a registered trademark of the DuPont Company.

Triggering Speed

These values apply to a new gun with a 12 ft (3.6 m), 1/4 in. (6.3 mm) OD cylinder air line and a .055 in. nozzle. These values will vary slightly with use and with variations in equipment.

Cylinder air pressure psi (MPa, bar)	Fluid pressure psi (MPa, bar)	Air pressure psi (MPa, bar)	msec to fully open	msec to fully close
50 (0.35, 3.5)	50 (0.35, 3.5)	100 (0.7, 7.0)	58.4	50.4

Sound Data (dBa)

Air Cap Part No.	Nozzle Part No. and Size	Atomizing Air Pressure psi (MPa, bar)	Fan Air Pressure psi (MPa, bar)	Sound Pressure dB(A)†	Sound Power dB(A)‡
195304	192297, 0.055 in.	43 psi (300 kPa, 3.0 bar)	43 psi (300 kPa, 3.0 bar)	85.9	86.7
		100 psi (0.7 MPa, 7.0 bar)	100 psi (0.7 MPa, 7.0 bar)	97	92.8

† Sound pressure was measured at 1 meter from unit.

‡ Sound power was tested in accordance with ISO 9614-2.

This image shows a full page of blank, lined paper. It features approximately 20 horizontal grey lines spaced evenly apart, typical of notebook paper. The lines extend across the entire width of the page, leaving small margins at the top and bottom. There are no vertical lines, text, or other markings present.

Graco Standard Warranty

Graco warrants all equipment manufactured by Graco and bearing its name to be free from defects in material and workmanship on the date of sale by an authorized Graco distributor to the original purchaser for use. With the exception of any special, extended, or limited warranty published by Graco, Graco will, for a period of twelve months from the date of sale, repair or replace any part of the equipment determined by Graco to be defective. This warranty applies only when the equipment is installed, operated and maintained in accordance with Graco's written recommendations.

This warranty does not cover, and Graco shall not be liable for general wear and tear, or any malfunction, damage or wear caused by faulty installation, misapplication, abrasion, corrosion, inadequate or improper maintenance, negligence, accident, tampering, or substitution of non-Graco component parts. Nor shall Graco be liable for malfunction, damage or wear caused by the incompatibility of Graco equipment with structures, accessories, equipment or materials not supplied by Graco, or the improper design, manufacture, installation, operation or maintenance of structures, accessories, equipment or materials not supplied by Graco.

This warranty is conditioned upon the prepaid return of the equipment claimed to be defective to an authorized Graco distributor for verification of the claimed defect. If the claimed defect is verified, Graco will repair or replace free of charge any defective parts. The equipment will be returned to the original purchaser transportation prepaid. If inspection of the equipment does not disclose any defect in material or workmanship, repairs will be made at a reasonable charge, which charges may include the costs of parts, labor, and transportation.

THIS WARRANTY IS EXCLUSIVE, AND IS IN LIEU OF ANY OTHER WARRANTIES, EXPRESS OR IMPLIED, INCLUDING BUT NOT LIMITED TO WARRANTY OF MERCHANTABILITY OR WARRANTY OF FITNESS FOR A PARTICULAR PURPOSE.

Graco's sole obligation and buyer's sole remedy for any breach of warranty shall be as set forth above. The buyer agrees that no other remedy (including, but not limited to, incidental or consequential damages for lost profits, lost sales, injury to person or property, or any other incidental or consequential loss) shall be available. Any action for breach of warranty must be brought within two (2) years of the date of sale.

Graco makes no warranty, and disclaims all implied warranties of merchantability and fitness for a particular purpose in connection with accessories, equipment, materials or components sold but not manufactured by Graco. These items sold, but not manufactured by Graco (such as electric motors, switches, hose, etc.), are subject to the warranty, if any, of their manufacturer. Graco will provide purchaser with reasonable assistance in making any claim for breach of these warranties.

In no event will Graco be liable for indirect, incidental, special or consequential damages resulting from Graco supplying equipment hereunder, or the furnishing, performance, or use of any products or other goods sold hereto, whether due to a breach of contract, breach of warranty, the negligence of Graco, or otherwise.

FOR GRACO CANADA CUSTOMERS

The parties acknowledge that they have required that the present document, as well as all documents, notices and legal proceedings entered into, given or instituted pursuant hereto or relating directly or indirectly hereto, be drawn up in English. Les parties reconnaissent avoir convenu que la rédaction du présente document sera en Anglais, ainsi que tous documents, avis et procédures judiciaires exécutés, donnés ou intentés à la suite de ou en rapport, directement ou indirectement, avec les procédures concernées.

Graco Information

TO PLACE AN ORDER, contact your Graco distributor, or call one of the following numbers to identify the distributor closest to you:

1-800-367-4023 Toll Free

612-623-6921

612-378-3505 Fax

*All written and visual data contained in this document reflects the latest product information available at the time of publication.
Graco reserves the right to make changes at any time without notice.*

Sales Offices: Minneapolis, Detroit
International Offices: Belgium, Korea, Hong Kong, Japan

www.graco.com

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